

CLAIMS

1. A DNA which comprises a base sequence shown by SEQ ID NO: 1 in the sequence listing or its complementary sequence, or a sequence containing part or whole of these sequences.
2. A DNA which hybridizes with the DNA according to claim 1 under a stringent condition, and which encodes a polypeptide having glucose and/or fructose transporter function.
3. A DNA which encodes the following polypeptide (a) or (b);
(a) a polypeptide which comprises an amino acid sequence shown by SEQ ID NO: 2 in the sequence listing,
(b) a polypeptide which comprises an amino acid sequence wherein one or a few amino acids are deleted, substituted or added in the amino acid sequence shown by SEQ ID NO: 2 in the sequence listing, and which has glucose and/or fructose transporter function.
4. A polypeptide which comprises an amino acid sequence shown by SEQ ID NO: 2 in the sequence listing.
5. A polypeptide which comprises an amino acid sequence wherein one or a few amino acids are deleted, substituted or added in the amino acid sequence shown by SEQ ID NO: 2 in the sequence listing, and which has glucose and/or fructose transporter function.
6. A method for producing a polypeptide which has glucose and/or fructose transporter function, wherein the DNA according to

claims 1 to 3 is incorporated into an expression vector and expressed by introducing the recombinant expression vector into a host cell.

7. An antibody which is induced by using the polypeptide according to claim 4 or 5, and which binds to the polypeptide specifically.

8. The antibody according to claim 7, wherein the antibody is a monoclonal antibody.

9. The antibody according to claim 7, wherein the antibody is a polyclonal antibody.

10. A method for producing an animal tissue cell expressing a polypeptide which has glucose and/or fructose transporter function, wherein the DNA according to any one of claims 1 to 3 is introduced into an animal tissue cell.

11. The method for producing an animal tissue cell expressing a polypeptide which has glucose and/or fructose transporter function according to claim 10, wherein the animal tissue cell is a tissue cell of rat kidney, an epithelial cell derived from porcine kidney, an epithelial cell derived from canine kidney or an epithelial cell derived from opossum kidney.

12. The method for producing an animal tissue cell expressing a polypeptide which has glucose and/or fructose transporter function according to claim 10, wherein the animal tissue cell is HEK293, a transfected human embryonic kidney cell line.

13. An animal tissue cell expressing a polypeptide which has glucose and/or fructose transporter function, which is produced by the method according to any one of claims 10 to 12.

14. A method for screening a substance having a glucose and/or fructose transporter function-regulating activity, wherein an effect of a test substance on glucose transport function is measured with the use of the animal tissue cell expressing a polypeptide which has glucose and/or fructose transporter function according to claim 13.

15. A non-human animal model which develops renal diabetes caused by a defect in renal glucose reabsorption, whose gene function to express a polypeptide which has glucose and/or fructose transporter function shown by SEQ ID NO: 2 in the sequence listing is deficient in its chromosome.

16. The non-human animal model which develops renal diabetes according to claim 15, wherein the deficiency in the gene function to express a polypeptide which has glucose and/or fructose transporter function is deficiency in a function of a gene which expresses a polypeptide which has glucose and/or fructose transporter function shown by SEQ ID NO: 1 in the sequence listing.

17. A method for screening a preventive/therapeutic drug for renal diabetes caused by a defect in glucose reabsorption, wherein a test substance is administered to the non-human animal model which develops renal diabetes caused by a defect in renal glucose and/or fructose reabsorption according to claim 15 or 16, and glucose reabsorption ability of the non-human animal

model, or a cell, a tissue or an organ of the non-human animal model is measured/evaluated.

18. A probe for diagnosing glucose and/or fructose transporter function comprising whole or part of an antisense strand of the base sequence according to claim 1.

19. A microarray or a DNA chip for diagnosing glucose and/or fructose transporter function, wherein at least one DNA according to any one of claims 1 to 3 is immobilized.

20. A pharmaceutical for diagnosing glucose and/or fructose transporter function, wherein the antibody according to any one of claims 7 to 9 and/or the probe for diagnosing according to claim 18 is prepared.

21. A method for diagnosing glucose and/or fructose transporter function, wherein a sample is obtained from a test substance, and the expression of the gene according to claim 1 in the sample is measured.

22. A method for diagnosing glucose and/or fructose transporter function, wherein the measurement of the gene expression according to claim 21 is conducted with the probe for diagnosing glucose and/or fructose transporter function according to claim 18, or with the microarray or the DNA chip for diagnosing glucose and/or fructose transporter function according to claim 19.

23. A method for diagnosing glucose and/or fructose transporter function, wherein a sample is obtained from a test substance

and cultured, and the polypeptide according to claim 4 produced by the expression of the gene in the sample is measured.

24. A method for diagnosing glucose and/or fructose transporter function, wherein the measurement of the polypeptide according to claim 23 is conducted with the antibody according to any one of claims 7 to 9.

25. A method for diagnosing a renal disease, wherein the diagnosis of glucose and/or fructose transporter function according to any one of claims 21 to 24 is measurement of glucose and/or fructose transporter function in a renal disease.

26. A method for regulating glucose and/or fructose transporter function in an animal tissue cell, wherein the DNA according to any one of claims 1 to 3 is introduced into an animal tissue cell.

27. A method for regulating glucose and/or fructose transporter function in an animal tissue cell, wherein the expression of the DNA according to claim 1 is suppressed in an animal tissue cell.

28. A method for regulating glucose and/or fructose transporter function in an animal tissue cell, wherein the expression of the DNA according to claim 1 is suppressed in an animal tissue cell by introducing whole or part of an antisense strand of the DNA base sequence according to claim 1 into an animal tissue cell.

29. The method for regulating glucose and/or fructose transporter function in an animal tissue cell according to any one of claims 26 to 28, wherein the animal tissue cell is an animal kidney cell.